

FIG. 1 (PRIOR ART)

	Film formed with LDR (the first a-Si layer)	Film formed with HDR (the second a-Si layer)
SiH ₄ (sccm)	4400	5700
H ₂ (sccm)	22000	5400
H ₂ /SiH ₄	5.0	0.95
Pressure(mbar)	1.1	1.4
RF Power (W)	140	250

FIG. 2 (PRIOR ART)

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
11	6.686	5.384	3.327	0.567
12	6.38	4.564	3.351	0.543
18	6.472	4.438	3.302	0.548
19	6.81	4.459	3.409	0.583
20	6.512	4.794	3.359	0.553
Average	6.572	4.7278	3.3496	0.5588

FIG. 3 (PRIOR ART)

FIG. 4A

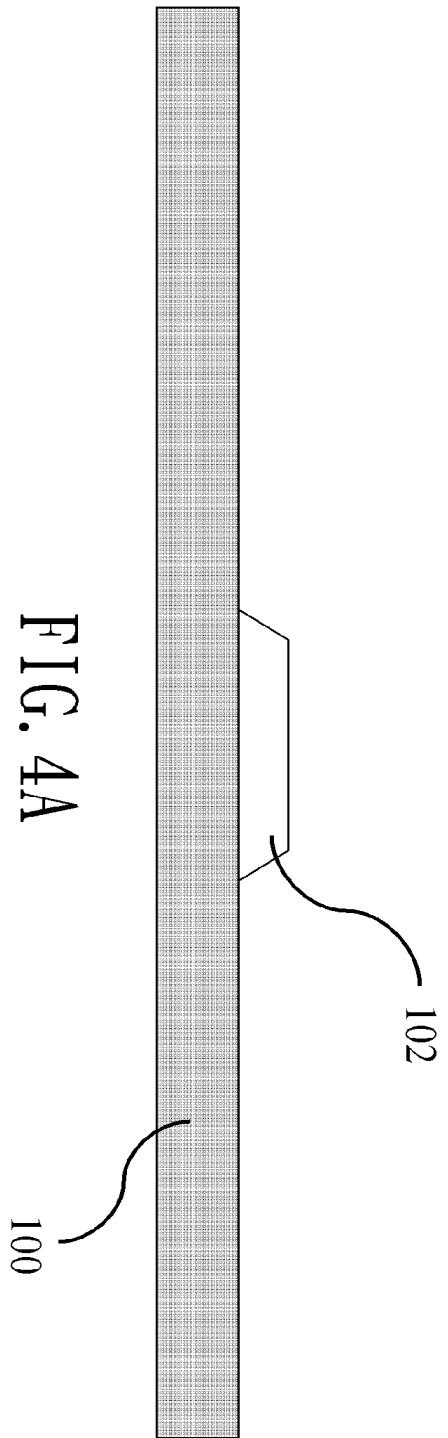


FIG. 4B

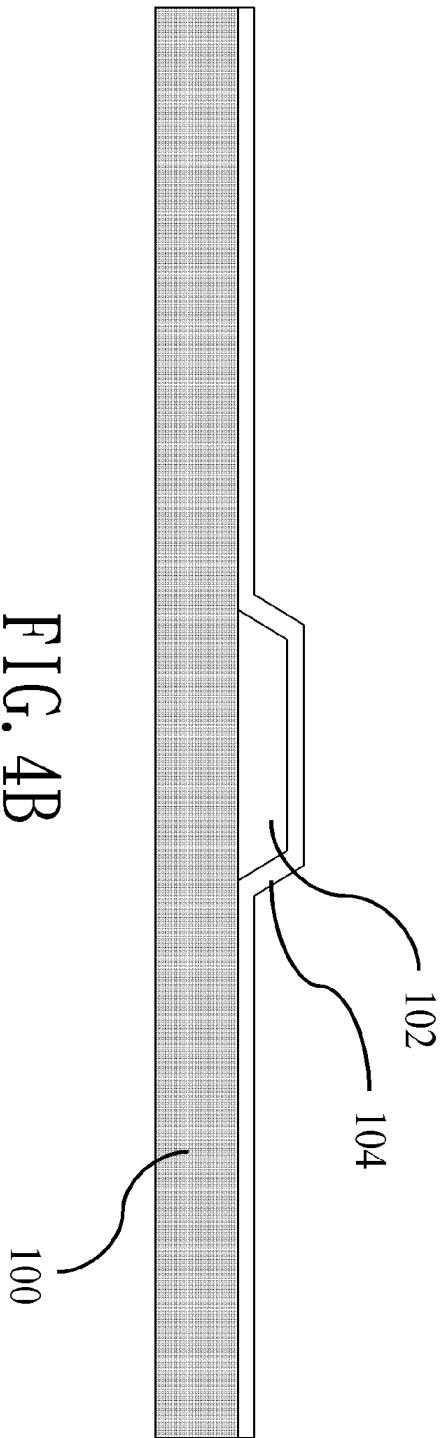
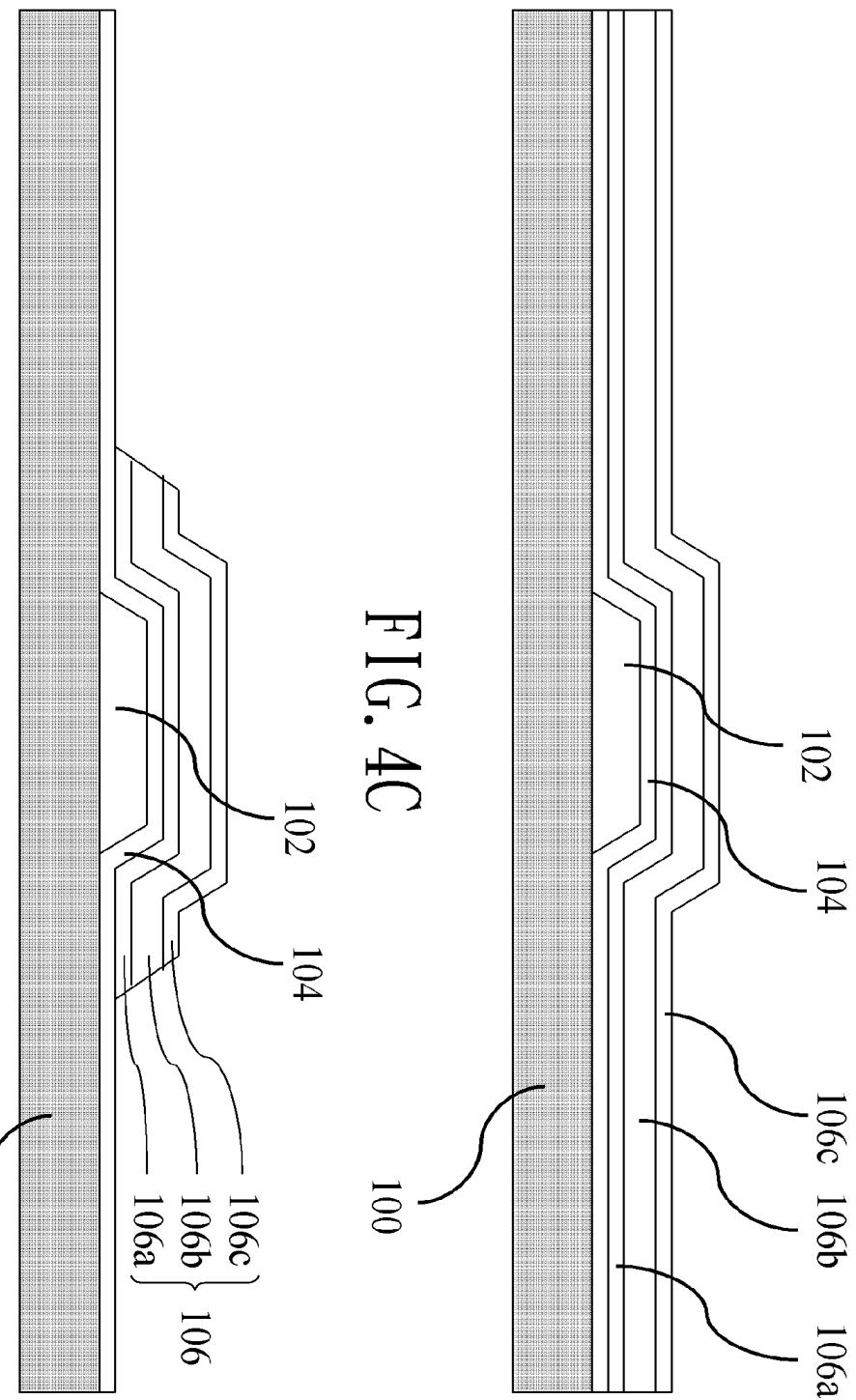
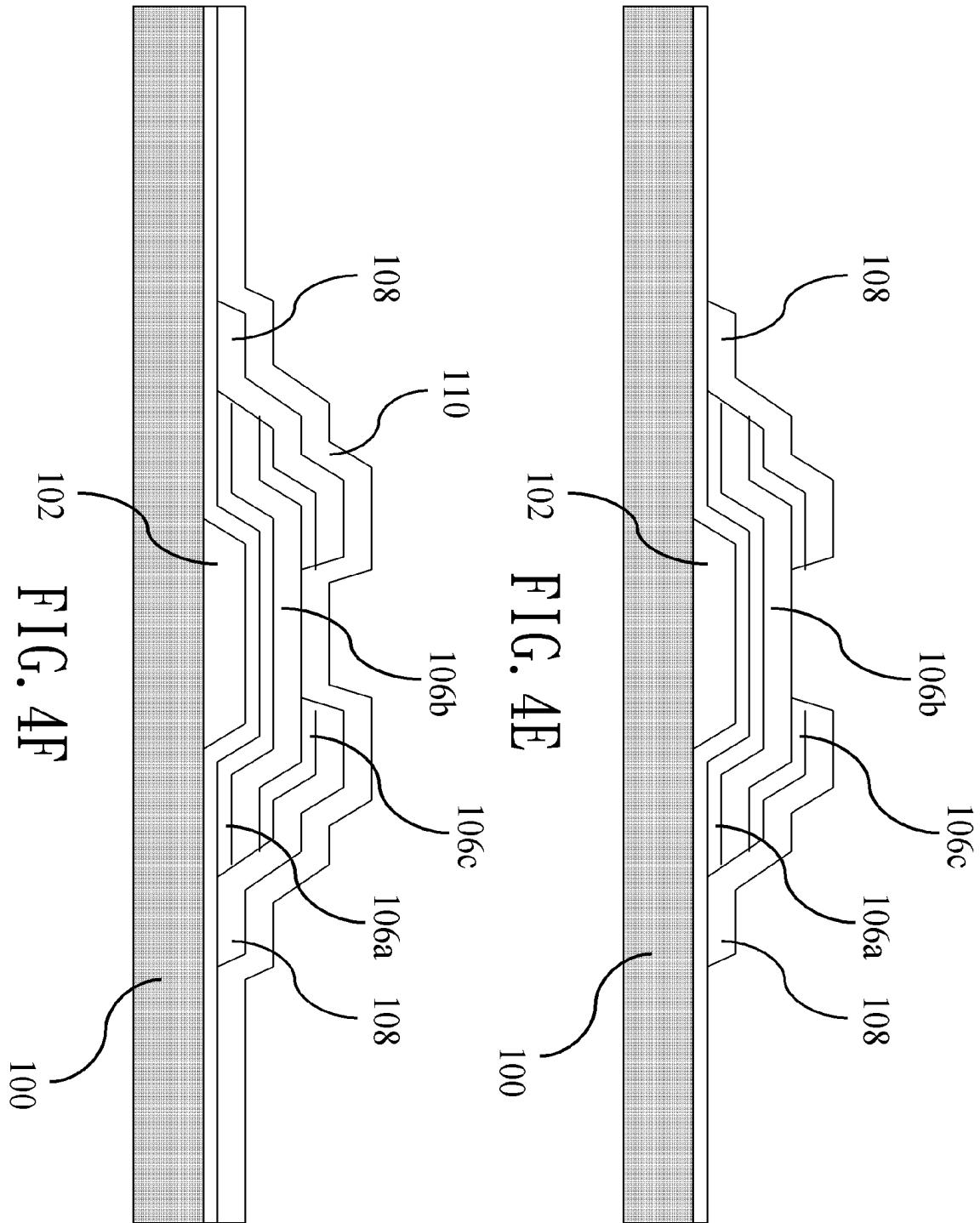


FIG. 4D





	Prior art	Present embodiment
SiH_4 (sccm)	4400	1000~4600
H_2 (sccm)	22000	400~4600
H_2/SiH_4	5.0	0.40~1.00
Pressure (mbar)	1.1	0.75~1.00
RF Power (W)	140	70~100

FIG. 5

	Prior art	Present embodiment
SiH_4 (sccm)	5700	1000~5700
H_2 (sccm)	5400	950~5700
H_2/SiH_4	0.95	0.95~1.0
Pressure (mbar)	1.4	1.3~1.6
RF Power (W)	250	200~320

FIG. 6

DB025A

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1	7.968	3.107	2.362	0.611
2	7.622	4.066	2.466	0.591
3	7.706	2.759	2.435	0.596
9	8.476	3.86	2.37	0.651
10	7.784	3.899	2.415	0.601
Average	7.9112	3.5382	2.4096	0.61

FIG. 7

DT394A

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1	8	2.778	2.689	0.636
2	7.172	2.893	2.819	0.578
3	7.596	2.654	2.803	0.611
9	8.102	2.846	2.626	0.64
10	7.95	2.54	2.696	0.632
11	7.99	2.984	2.657	0.633
12	8.65	2.904	2.688	0.687
18	7.966	2.368	2.73	0.635
19	7.546	2.545	2.642	0.598
20	7.516	2.186	2.569	0.589
Average	7.8488	2.6698	2.6919	0.6239

FIG. 8

DT395A

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1	8.26	1.919	2.622	0.652
2	7.888	2.225	2.722	0.628
3	7.716	2.006	2.772	0.619
9	8.594	2.278	2.261	0.678
10	8.42	2.22	2.66	0.668
11	8.34	2.181	2.587	0.656
12	8.496	2.145	2.675	0.674
18	8.842	2.454	2.64	0.698
19	8.504	2.195	2.494	0.661
20	8.126	1.995	2.571	0.637
Average	8.3186	2.1618	2.6004	0.6571

FIG. 9

DB340A

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1	8.338	2.994	1.928	0.612
3	8.176	2.829	1.984	0.604
10	8.244	3.192	1.912	0.603
11	8.38	2.99	1.95	0.615
12	8.62	3.108	1.936	0.633
18	8.19	2.391	1.972	0.603
19	8.068	2.713	1.903	0.59
20	7.902	2.868	1.969	0.583
Average	8.23975	2.885625	1.94425	0.605375

FIG. 10

DT293A

ID	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1	7.882	2.925	2.275	0.599
2	7.6	2.858	2.343	0.582
3	7.532	2.622	2.392	0.579
9	8.144	2.534	2.24	0.617
10	7.862	3.321	2.288	0.598
11	7.988	2.789	2.261	0.607
12	8.166	2.608	2.273	0.62
18	8.256	2.754	2.338	0.632
19	7.782	2.396	2.238	0.589
20	7.77	2.245	2.187	0.586
Average	7.8982	2.7052	2.2835	0.6009

FIG. 11

	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
DT293A	7.8982	2.7052	2.2835	0.6009
DB340A	8.23975	2.885625	1.94425	0.605
DT395A	8.3186	2.1618	2.6004	0.6571
DT394A	7.84881	2.6698	2.6919	0.6239
DB025A	7.91121	3.5382	2.4096	0.61
Average	8.043314	2.792125	2.38593	0.61938

FIG. 12

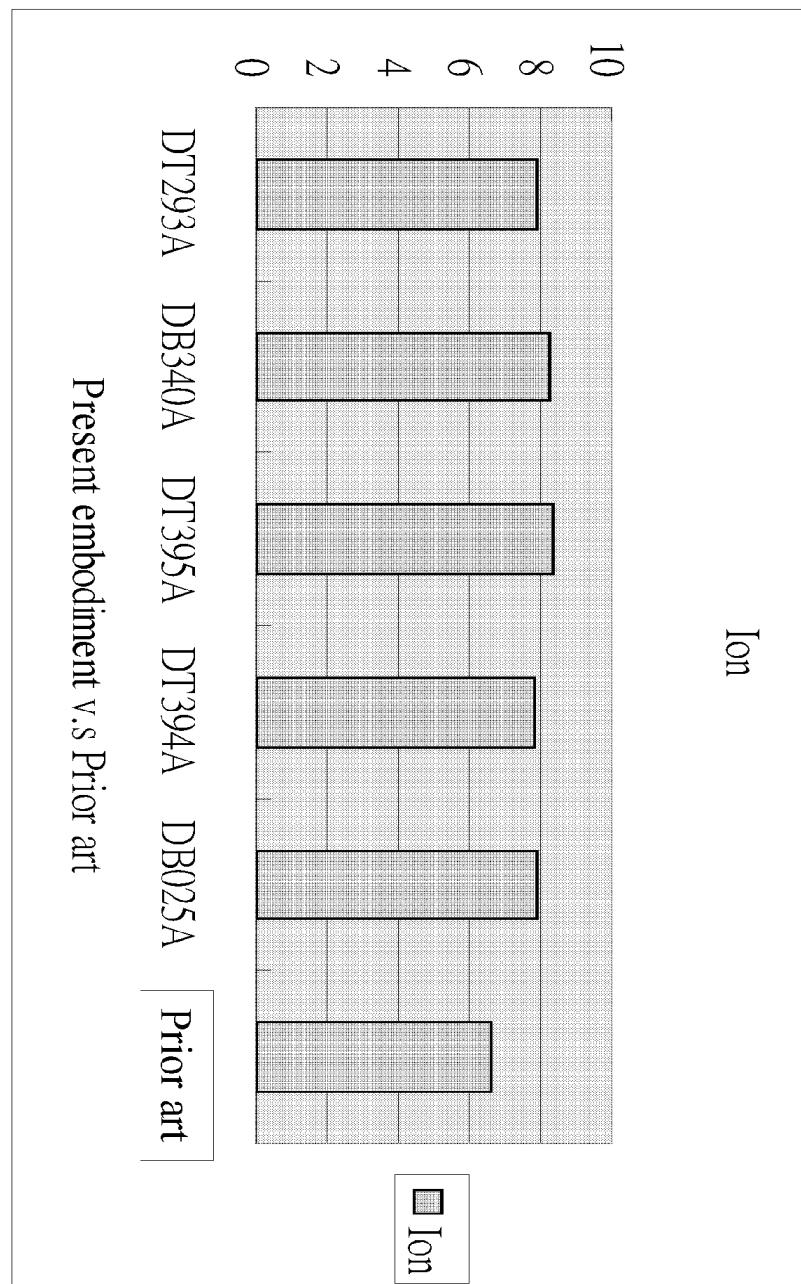
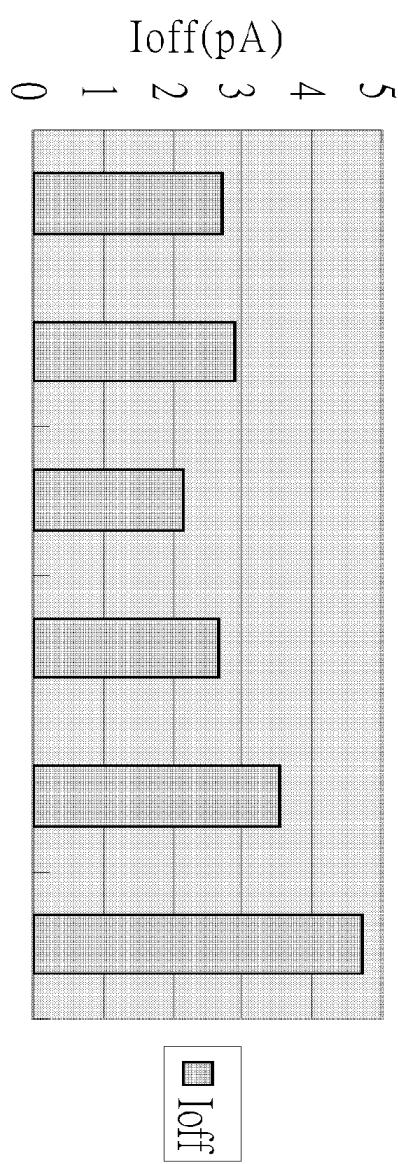


FIG. 13

Ioff



DT293A DB340A DT395A DT394A DB025A

Prior art

Present embodiment V.S. Prior art

FIG. 14

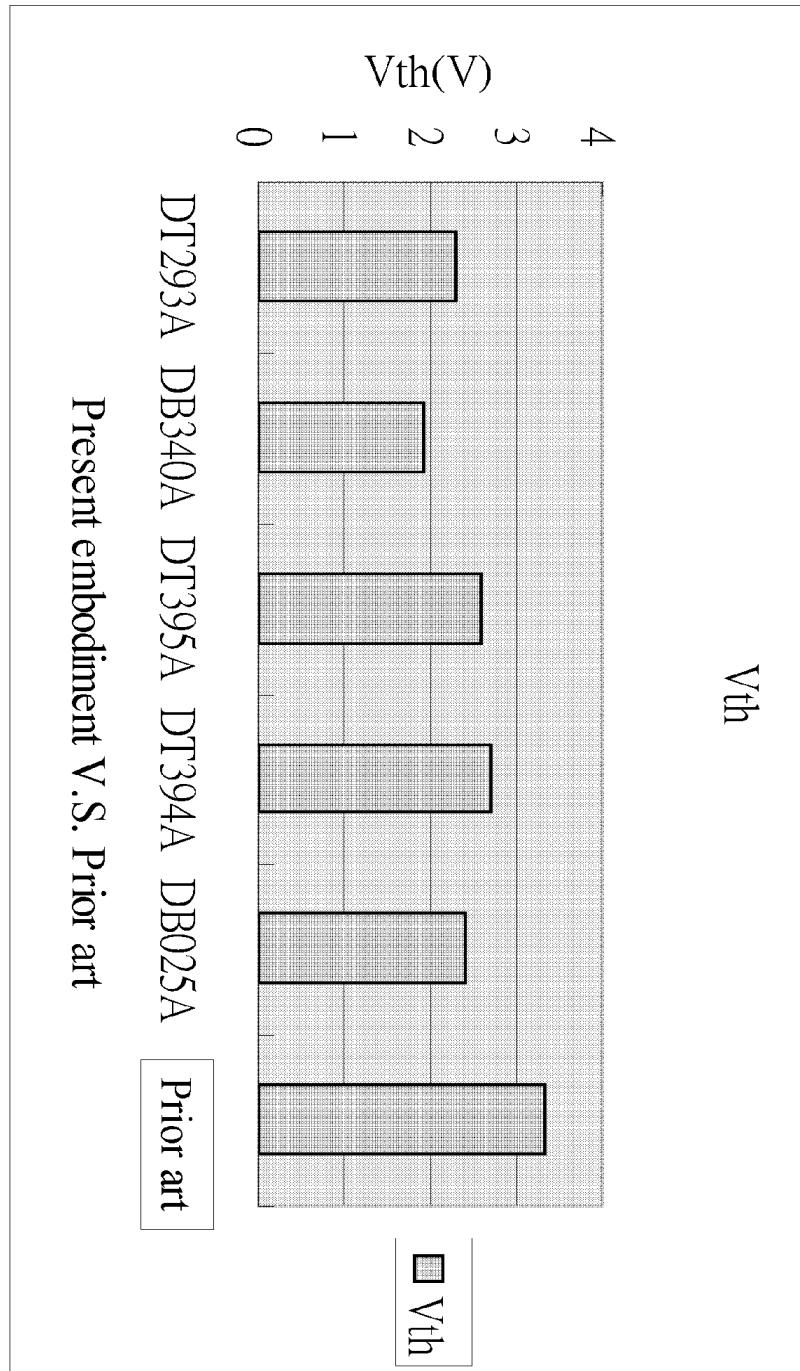


FIG. 15

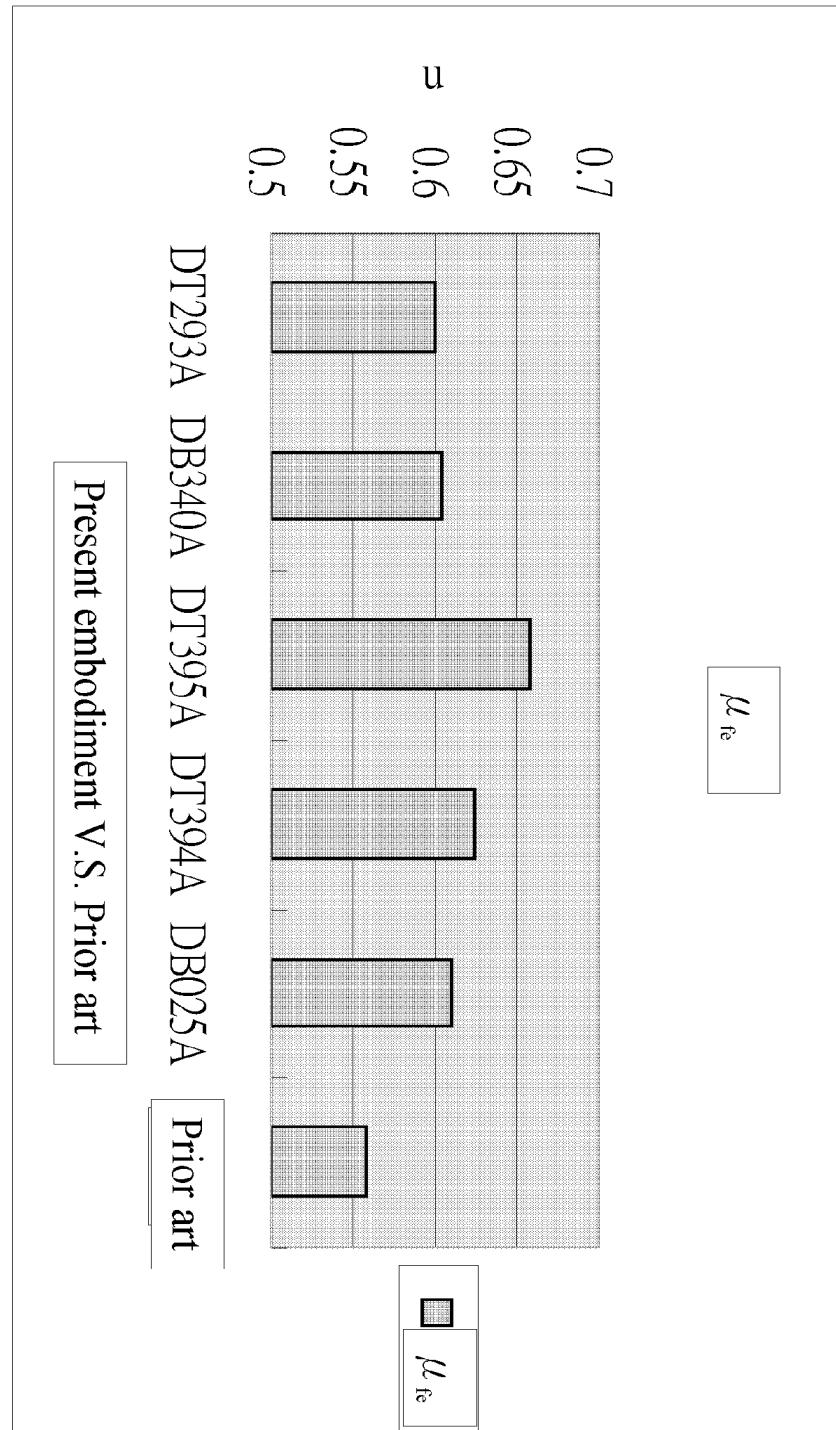


FIG. 16

	Prior art	Present embodiment
I_{photo}	1E-10	5E-11
$I_{\text{on}} (\mu \text{A})$	6.57	8.04
$I_{\text{off}} (\mu \text{A})$	4.72	2.79
$V_{\text{th}} (\text{V})$	3.34	2.38
$\mu_e (\text{cm}^2/\text{s.v})$	0.55	0.62
H_2/SiH_4	5.0	0.40~1.00

FIG. 17

Thickness of the second a-Si layer	On current $I_{on}(\mu A)$	Off current $I_{off}(pA)$	Threshold voltage $V_{th}(V)$	Migration rate $\mu_{fe} (cm^2/v.s)$
1000 Å	3.5415	4.19775	5.27225	0.36875
1250 Å	5.0105	4.264	4	0.45775
1500 Å	5.5355	4.4285	3.54125	0.482
1750 Å	5.909	4.27125	3.3065	0.504
2000 Å	6.1005	3.61125	3.15425	0.5145

FIG. 18

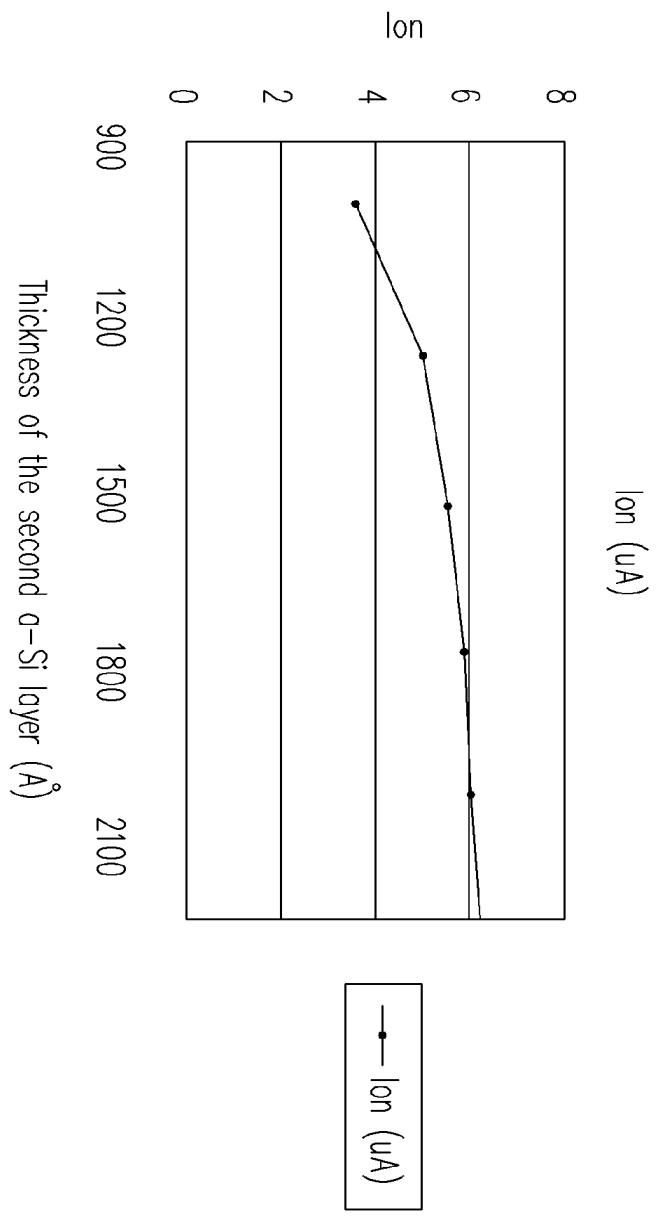


FIG. 19

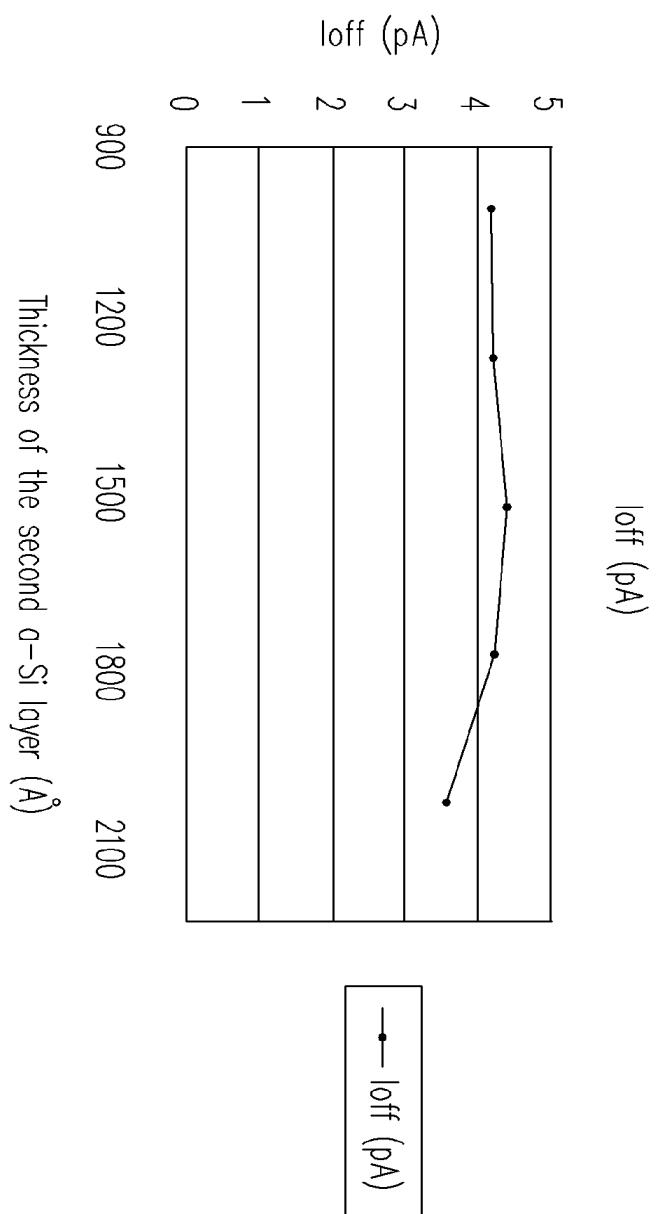


FIG. 20

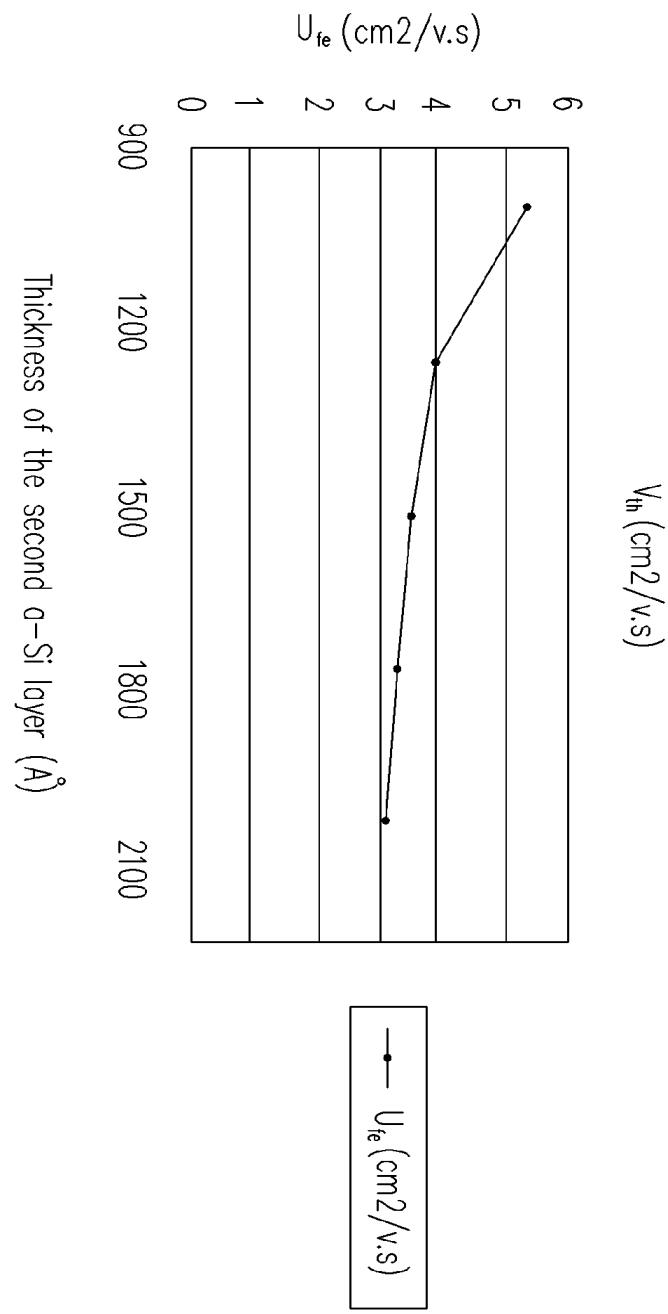


FIG. 21

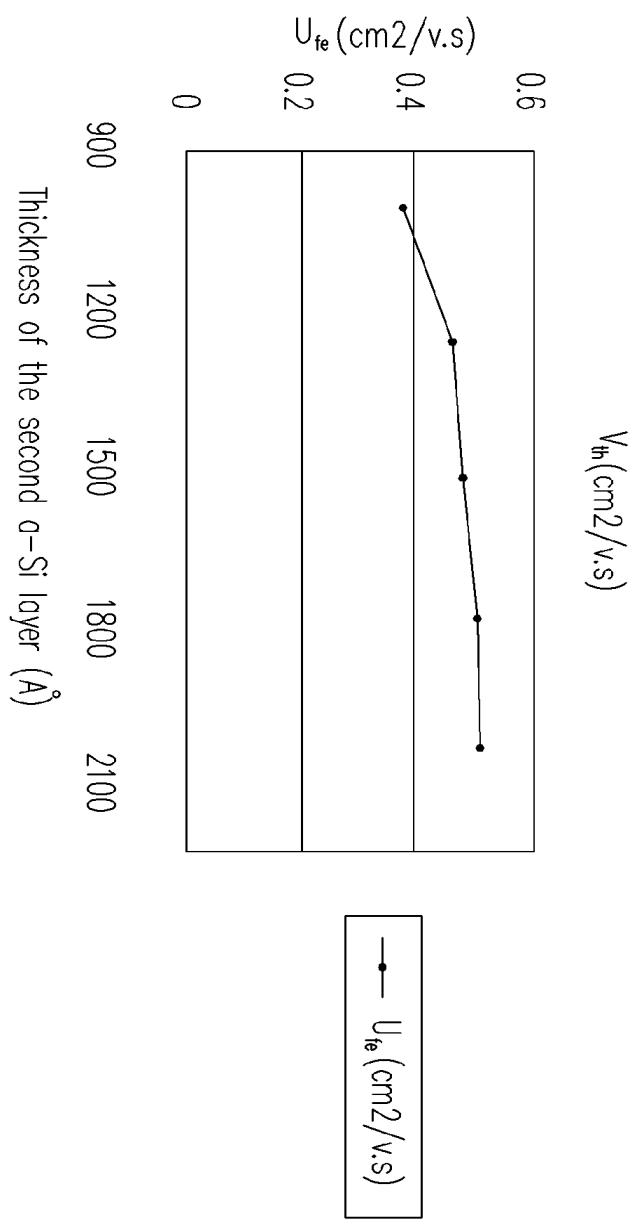


FIG. 22